Hartnup disease

Hartnup disease is a condition caused by the body's inability to absorb certain protein building blocks (amino acids) from the diet. As a result, affected individuals are not able to use these amino acids to produce other substances, such as vitamins and proteins. Most people with Hartnup disease are able to get the vitamins and other substances they need with a well-balanced diet.

People with Hartnup disease have high levels of various amino acids in their urine (aminoaciduria). For most affected individuals, this is the only sign of the condition. However, some people with Hartnup disease have episodes during which they exhibit other signs, which can include skin rashes; difficulty coordinating movements (cerebellar ataxia); and psychiatric symptoms, such as depression or psychosis. These episodes are typically temporary and are often triggered by illness, stress, nutrient-poor diet, or fever. These features tend to go away once the trigger is remedied, although the aminoaciduria remains. In affected individuals, signs and symptoms most commonly occur in childhood.

Frequency

Hartnup disease is estimated to affect 1 in 30,000 individuals.

Genetic Changes

Hartnup disease is caused by mutations in the *SLC6A19* gene. This gene provides instructions for making a protein called B^0AT1, which is primarily found embedded in the membrane of intestine and kidney cells. The function of this protein is to transport certain amino acids into cells. In the intestines, amino acids from food are transported into intestinal cells then released into the bloodstream so the body can use them. In the kidneys, amino acids are reabsorbed into the bloodstream instead of being removed from the body in urine. In the body, these amino acids are used in the production of many other substances, including vitamins and proteins. One particular amino acid transported by B^0AT1, tryptophan, is needed to produce vitamin B3 (also known as niacin).

SLC6A19 gene mutations result in the production of a B^0AT1 protein with reduced activity. As a result, specific amino acids cannot be taken in by cells and are instead removed from the body as waste. Because these amino acids are removed from the body without being used, people with this condition may be lacking (deficient) in certain amino acids and vitamins. However, individuals who are nutrient-deficient due to their diet, illness, stress, or a variety of other reasons, can develop serious signs

and symptoms of this condition including rashes, cerebellar ataxia, and psychiatric symptoms. Researchers believe that many of these features are related to a deficiency of tryptophan and niacin, specifically.

Inheritance Pattern

This condition is inherited in an autosomal recessive pattern, which means both copies of the gene in each cell have mutations. The parents of an individual with an autosomal recessive condition each carry one copy of the mutated gene, but they typically do not show signs and symptoms of the condition.

Other Names for This Condition

- Hartnup disorder
- Hartnup's disease
- neutral amino acid transport defect

Diagnosis & Management

Genetic Testing

- Genetic Testing Registry: Neutral 1 amino acid transport defect
  https://www.ncbi.nlm.nih.gov/gtr/conditions/C0018609/

Other Diagnosis and Management Resources

- MedlinePlus Encyclopedia: Aminoaciduria
  https://medlineplus.gov/ency/article/003366.htm

General Information from MedlinePlus

- Diagnostic Tests
  https://medlineplus.gov/diagnostictests.html
- Drug Therapy
  https://medlineplus.gov/drugtherapy.html
- Genetic Counseling
  https://medlineplus.gov/geneticcounseling.html
- Palliative Care
  https://medlineplus.gov/palliativecare.html
- Surgery and Rehabilitation
  https://medlineplus.gov/surgeryandrehabilitation.html

Additional Information & Resources

MedlinePlus

- Encyclopedia: Aminoaciduria
  https://medlineplus.gov/ency/article/003366.htm
- Encyclopedia: Hartnup Disorder
  https://medlineplus.gov/ency/article/001201.htm
- Health Topic: Amino Acid Metabolism Disorders
  https://medlineplus.gov/aminoacidmetabolismdisorders.html

Genetic and Rare Diseases Information Center

- Hartnup disease
  https://rarediseases.info.nih.gov/diseases/6569/hartnup-disease

Educational Resources

- CLIMB: Hartnup Disease Info Sheet
  http://www.climb.org.uk/IMD/Hotel/HartnupDisease.pdf
- Disease InfoSearch: Hartnup Disease
  http://www.diseaseinfosearch.org/Hartnup+Disease/3246
- MalaCards: hartnup disorder
  http://www.malacards.org/card/hartnup_disorder
- Merck Manual Consumer Version
  http://www.merckmanuals.com/home/children-s-health-issues/congenital-kidney-tubular-disorders/hartnup-disease
- Orphanet: Hartnup disease
  http://www.orpha.net/consor/cgi-bin/OC_Exp.php?Lng=EN&Expert=2116

Patient Support and Advocacy Resources

- Ataxia UK
  https://www.ataxia.org.uk/
- CLIMB: Children Living with Inherited Metabolic Diseases (UK)
  http://www.climb.org.uk/
- National Organization for Rare Disorders (NORD)
  https://rarediseases.org/rare-diseases/hartnup-disease/

Scientific Articles on PubMed

- PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28Hartnup+disease%5BTI%5D%29+OR+%28Hartnup+disorder%5BTI%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D

OMIM

- HARTNUP DISORDER
  http://omim.org/entry/234500

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